

## CLAIMS

### WHAT IS CLAIMED IS:

- 1        1. A method of analyzing anisotropic turbulent flows of an anisotropic fluid
- 2        comprising:
  - 3                defining a set of moment equations governing time average thermal and turbulent
  - 4                motion, directional kinetic energy, shear, directional kinetic energy fluxes, and structure
  - 5                correlations; and
  - 6                defining  $n^{\text{th}}$  order directional kinetic energy fluxes and structure correlation
  - 7                equations closure relationships using  $(n + 1)^{\text{th}}$  order density gradient independent time
  - 8                average thermal and turbulent moment closure relationships to yield a set of closed time
  - 9                average turbulent moment equations.
- 1        2. The method of claim 1 wherein the set of moment equations governing time average
- 2        turbulent directional kinetic energy, shear, directional kinetic energy fluxes, and structure
- 3        correlations is defined by Equation Set 12.
- 1        3. The method of claim 1 wherein  $n$  is odd.
- 1        4. The method of claim 3 wherein the density gradient independent time average
- 2        thermal moment closure relationships are defined by Equation Set 16.
- 1        5. The method of claim 3 wherein the density gradient independent time average
- 2        turbulent moment closure relationships are defined by Equation Set 17.

1           6.       The method of claim 1 further comprising solving  $(n + 1)^{\text{th}}$  and  $(n + 2)^{\text{th}}$  order  
2       moment sets.

1           7.       The method of claim 1 wherein the set of closed time average turbulent moment  
2       equations are defined by Equation Set 15.

1           8.       A method of analyzing time average directional thermal energy in turbulent flows of  
2       an anisotropic fluid by solving Equation 15-3.

1           9.       A method of analyzing time average thermal shear in turbulent flows of an  
2       anisotropic fluid by solving Equation 15-4.

1           10.      A method of analyzing time average directional thermal energy fluxes in turbulent  
2       flows of an anisotropic fluid by solving Equations 15-5 and 15-6.

1           11.      A method of analyzing time average thermal structure correlation in turbulent flows  
2       of an anisotropic fluid by solving Equation 15-7.

1           12.      A method of analyzing time average directional turbulent energy in turbulent flows  
2       of an anisotropic fluid by solving Equation 15-8.

1           13.      A method of analyzing time average turbulent shear in turbulent flows of an  
2       anisotropic fluid by solving Equation 15-9.

1           14.      A method of analyzing time average turbulent directional energy fluxes in turbulent  
2       flows of an anisotropic fluid by solving Equations 15-10 and 15-11.

1        15.        A method of analyzing time average turbulent structure correlation in turbulent flows  
2        of an anisotropic fluid by solving Equation 15-12.

1        16.        A method of analyzing turbulent flows of an isotropic liquid comprising:  
2                defining a set of moment equations governing time average directional kinetic  
3                energy, shear, directional kinetic energy fluxes, and structure correlations;  
4                defining  $n^{\text{th}}$  order directional kinetic energy fluxes and structure correlation  
5                equations closure relationships using  $(n + 1)^{\text{th}}$  order density gradient independent time  
6                average thermal and turbulent moment closure relationships to yield a set of closed time  
7                average turbulent moment equations;  
8                setting all directional thermal energies equal and solving the total thermal energy  
9                equation;  
10                setting density equal to a constant.

1        17.        The method of claim 16 further comprising solving the resultant equation set.

1        18.        The method of claim 16 further comprising adding the resulting turbulent flow  
2        equation set to conventional Navier Stokes equations for isotropic fluids and solving the now closed  
3        turbulent Navier Stokes set.